

Sir Arthur Keith: distinguished conservator of the Hunterian Museum, London

This year is the 150th anniversary of the birth of Sir Arthur Keith, a man who distinguished himself in a number of fields. He discovered the pacemaker of the heart, made important contributions to palaeoanthropology and, as curator of the Hunterian Museum at the Royal College of Surgeons of England, helped save Charles Darwin's home, Downe House, for the country. I became particularly interested in his life when I was asked, many years ago, to revise his entry in the *Dictionary of National Biography*.

Arthur Keith was born in 1866 at Old Machar in Aberdeenshire, the sixth of ten children, where his father was a farmer. To prepare for his medical studies, he first studied Latin and Greek at Gordon's College in Aberdeen, and then proceeded to Marischal College in 1884. Here he was inspired by the anatomist, John Struthers, to pursue an academic career. He was also influenced by Alexander Ogston, one of Lister's early followers in antiseptic surgery. Keith experimented on the effects of rifle bullets fired at close range into cans of water and then into the thighs of animals and was probably the first to demonstrate the explosive effects of high-velocity missiles on tissues.

Keith qualified MB (Bachelor of Medicine) with first class honours in 1888, became demonstrator in physiology and then accepted the post of medical officer to a mining company in Siam (now Thailand), with a commission to collect botanical specimens for Kew Gardens, London. However, Keith became particularly interested in anatomical studies of the local monkeys and gibbons and, on returning home, obtained his MD (Doctor of Medicine) in 1894 with a gold medal for his

thesis on the myology of catarrhine monkeys. At the same time he passed his Fellowship of the Royal College of Surgeons. The following year, Keith moved to London to teach anatomy at the London Hospital Medical School. In 1902 he published his *Human Embryology and Morphology*, a popular text that reached its 6th edition in 1948.

It was at the London Hospital Medical School that Keith, together with his colleague, the physiologist Martin Flack, made his most important discovery. In papers published between 1906 and 1910 they described the sinoatrial node of the heart, still known eponymously as the node of Keith and Flack. This structure, the 'pacemaker of the heart', is a small cluster of specialized cardiac muscle cells situated in the right atrium of the heart just to the right of the opening of the superior vena cava. From this area of intrinsic contractility, the cardiac impulse reaches the atrioventricular node, from which it spreads to the ventricular musculature via the atrioventricular bundle of His.

In 1908 Keith was elected conservator of the Hunterian Museum at the Royal College of Surgeons. Under his inspired directorship, he attracted surgeons, anatomists and anthropologists to work with him, resulting in much interesting research on surgical disabilities and on human evolution. For example, in 1919 he reported in the *Journal of Anatomy* the not uncommon growth disorder of diaphyseal acclasia, a defect of bone remodelling which results in the formation of multiple exostoses near the joint surfaces.

Soon after his appointment at the College, Keith began to give courses of lectures there and rapidly gained a reputation as a gifted teacher. He also now gave his active attention to the understanding of human evolution.

The publication of the alleged discovery in a gravel pit in Piltdown, Sussex, in 1912 of what was claimed to be part of a primitive humanoid fossil skull and part of a mandible, displaying marked ape-

like features ('the Piltdown man'), created great interest and was said to be an early predecessor of man. Keith disagreed and believed the skull to resemble that of *Homo sapiens*. In spite of his doubts, he thought the skull might be a forerunner of man. In 1953, with Keith now an old and ill man, a publication by Joe Weiner and his colleagues from the Anatomy Department in Oxford, using modern techniques including electron microscopy, showed that the fragments were undoubted fakes. The mandible fragment had been stained with iron-containing paint and the teeth filed down. It had probably been derived from a modern immature orangutan. The skull fragment was stained with iron sulphate and was probably modern. The perpetrator of this hoax was probably a local anthropologist. Poor Arthur Keith; the exposure that the skull and other artefacts were fake distressed him sorely in his last years. The tragedy to him, he said, was 'the loss of faith in the testimony of our fellow workers'.

In 1915, Keith published his book *The Antiquity of Man*, which reviewed all the fossil remains of man known at that time. It was widely read and was updated in 1931 by a supplementary volume.

During the First World War, Keith occupied himself with the problems of surgical anatomy related to war wounds. In 1919 he published some of his lectures on these topics in book form as *Menders of the Maimed*. His books made his name familiar to the lay public.

Keith had been elected a Fellow of the Royal Society as early as 1913 and was knighted in 1921. In 1927 he was elected President of the British Association and pleaded successfully for the preservation of Charles Darwin's home, at Downe in Kent.

In 1933, after a severe illness, Keith retired to live at Downe House, where he died in January 1955. He was buried in the churchyard at Downe. He was an erudite, kind, gentle and much-loved man. **BJHM**

Conflict of interest: none.

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